

Diabetes: An Issue for My Community

Student Presentation – The Biology of Type 2 Diabetes

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Tamaki College



Onehunga High School



Diabetes and Obesity: An Issue for My Community

This presentation is designed to help students develop their understanding of the biology behind Type 2 diabetes – the disease, the cause, treatments and prevention. It supports them as they work towards the completion of *Biology 1.2 Achievement Standard 90926v1 – report on a biological issue.*

Target Group: Year 11

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What is Diabetes?

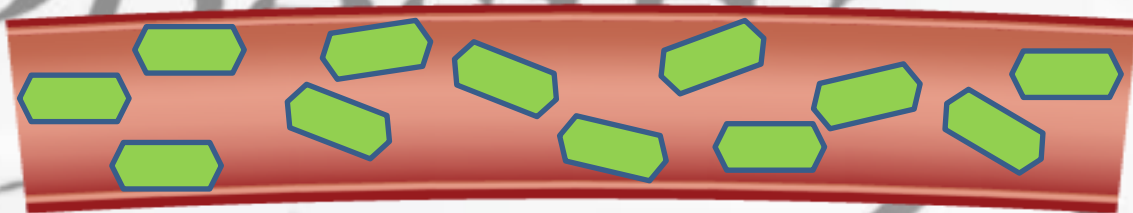
Diabetes

pancreas food Overw

Obesity

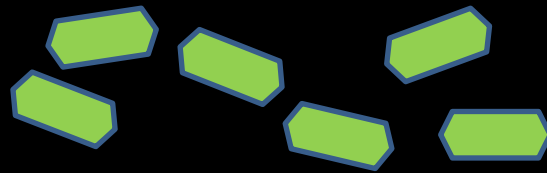
What is Diabetes?

Diabetes is a disease that occurs when we have too much glucose (sugar) in the blood.

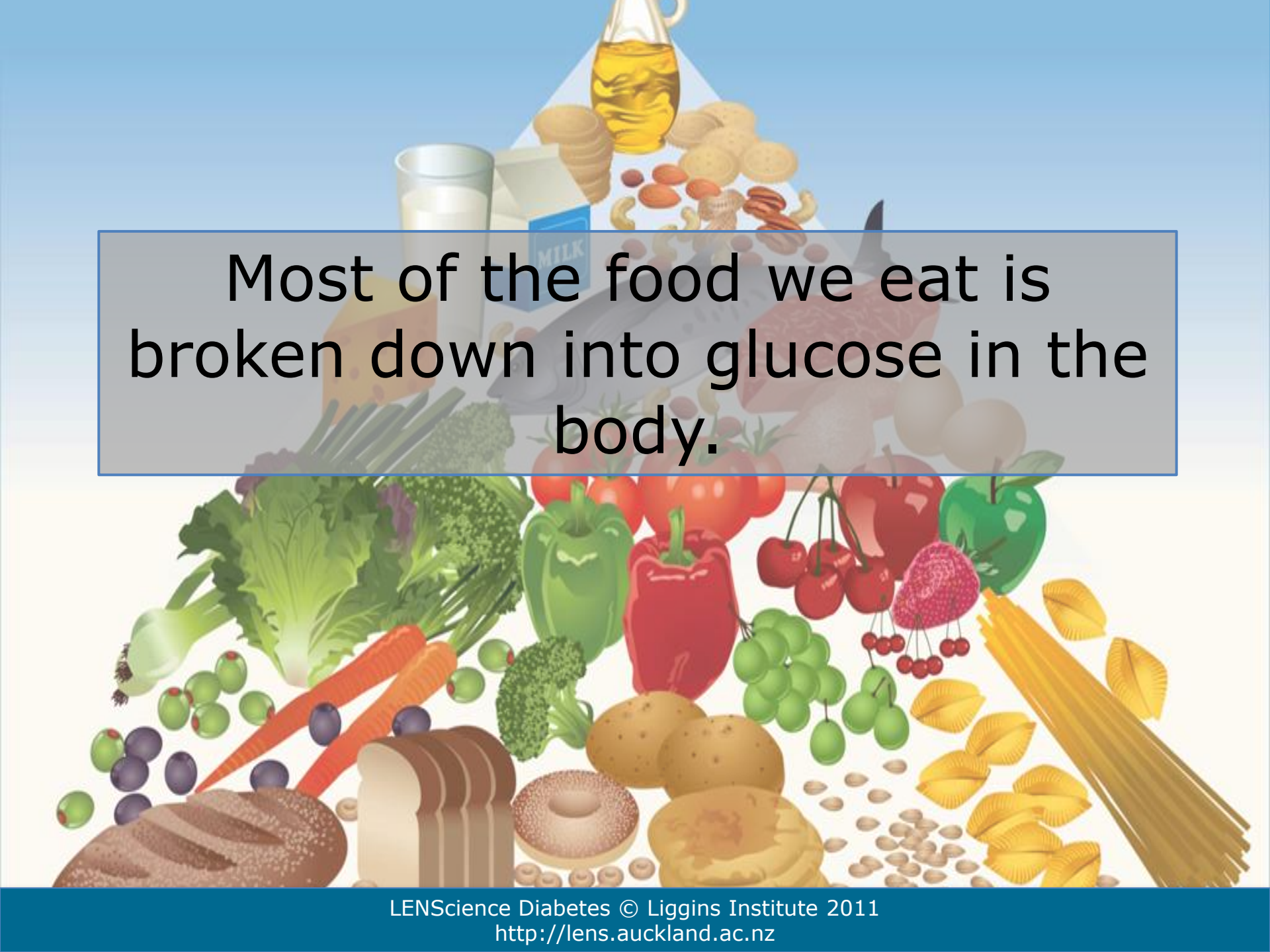


What is Glucose?

Glucose is the main source of energy for the bodies cells.

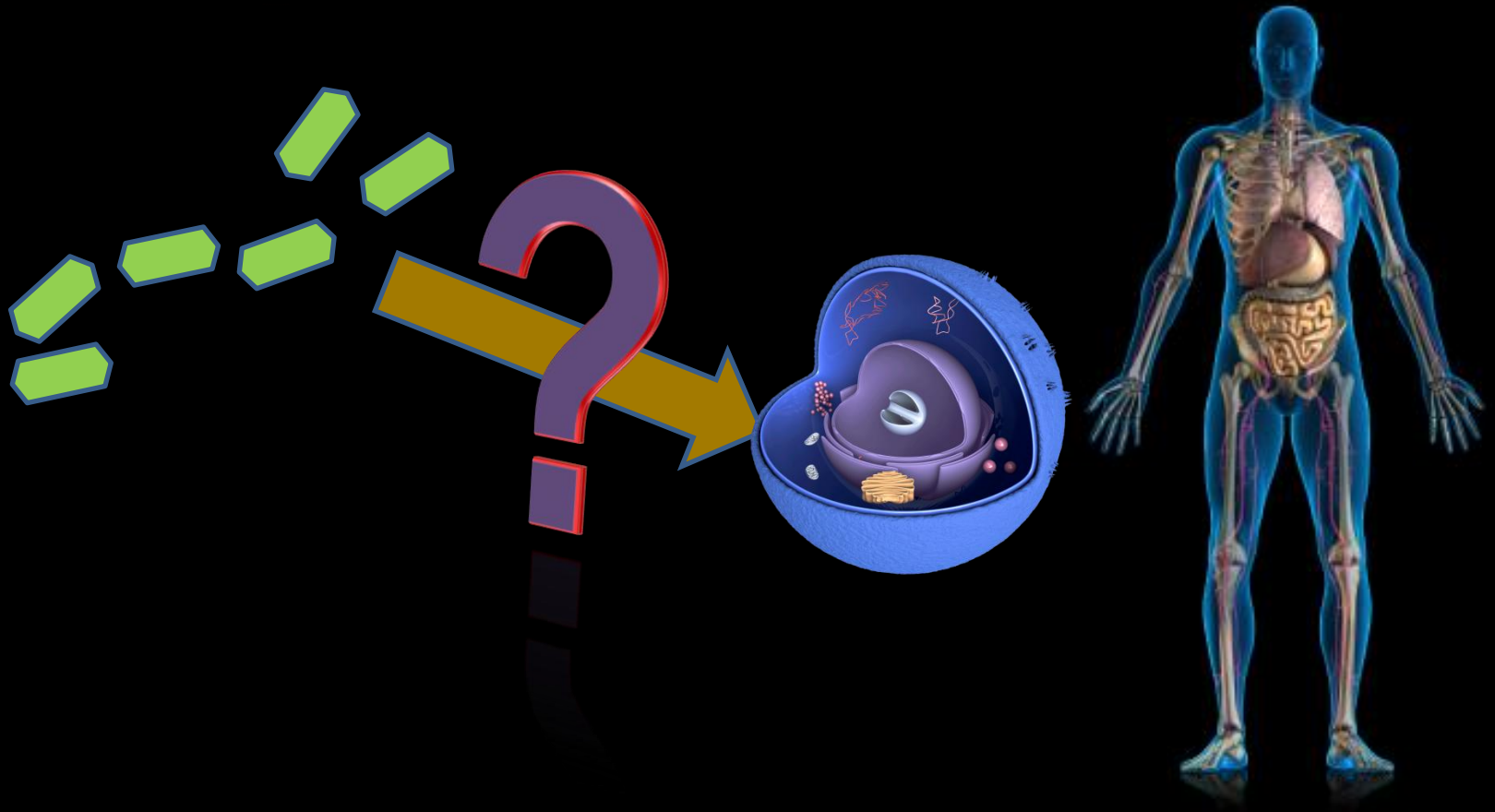




A vibrant collage of various food items. At the top, there's a glass of milk, a carton of milk, a bottle of oil, and some bread. Below these are various fruits like apples, grapes, and berries, and vegetables like broccoli, carrots, and bell peppers. There are also grains like corn and wheat, and some nuts. A central text box with a blue border contains the text: "Most of the food we eat is broken down into glucose in the body."

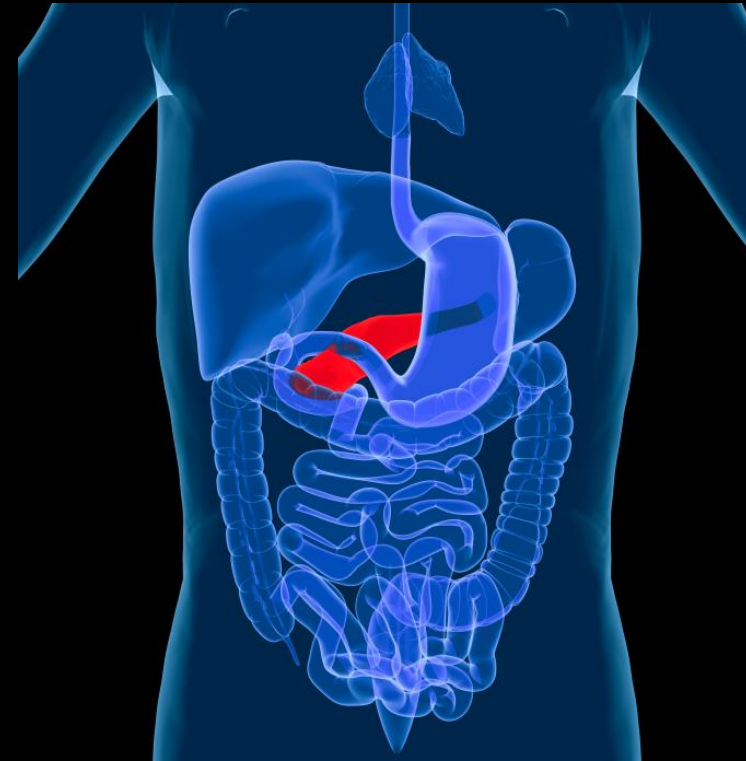
Most of the food we eat is broken down into glucose in the body.

How does glucose get into your bodies cells?



How does glucose get into your bodies cells?

A chemical called insulin is produced in the pancreas and its job is to help glucose move into the cells.

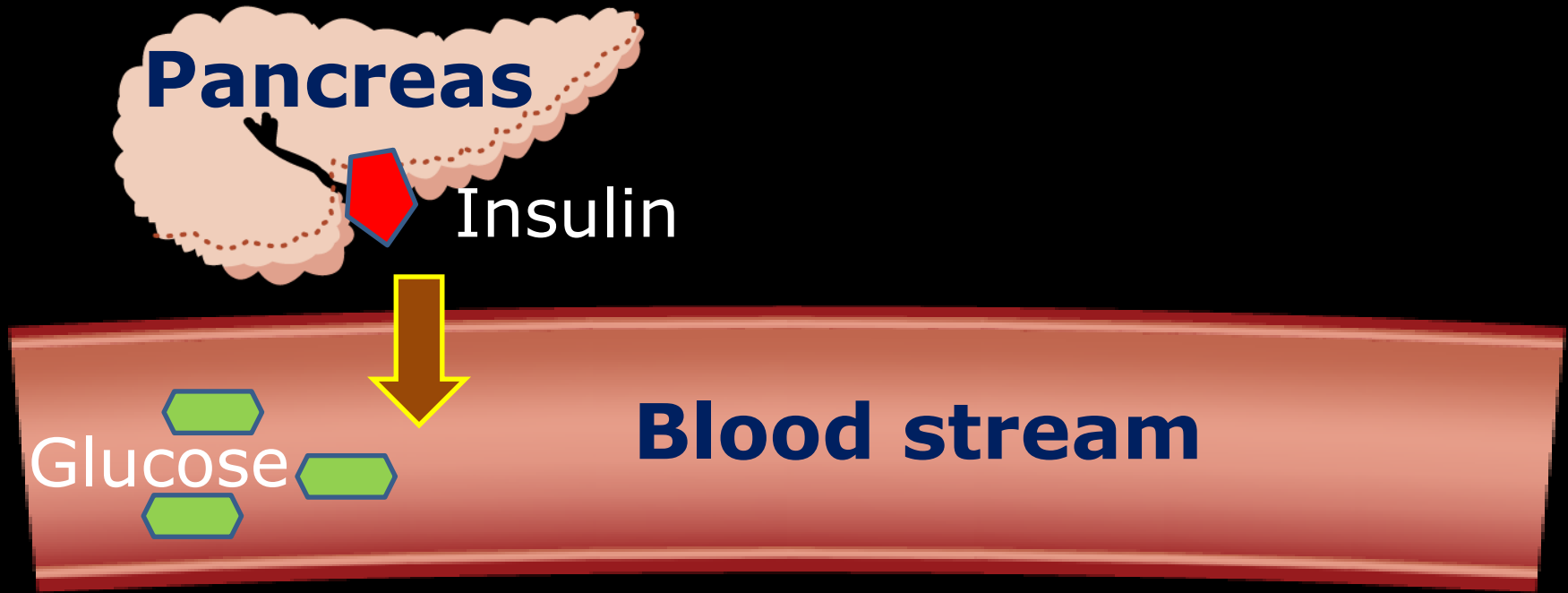


How does this happen?

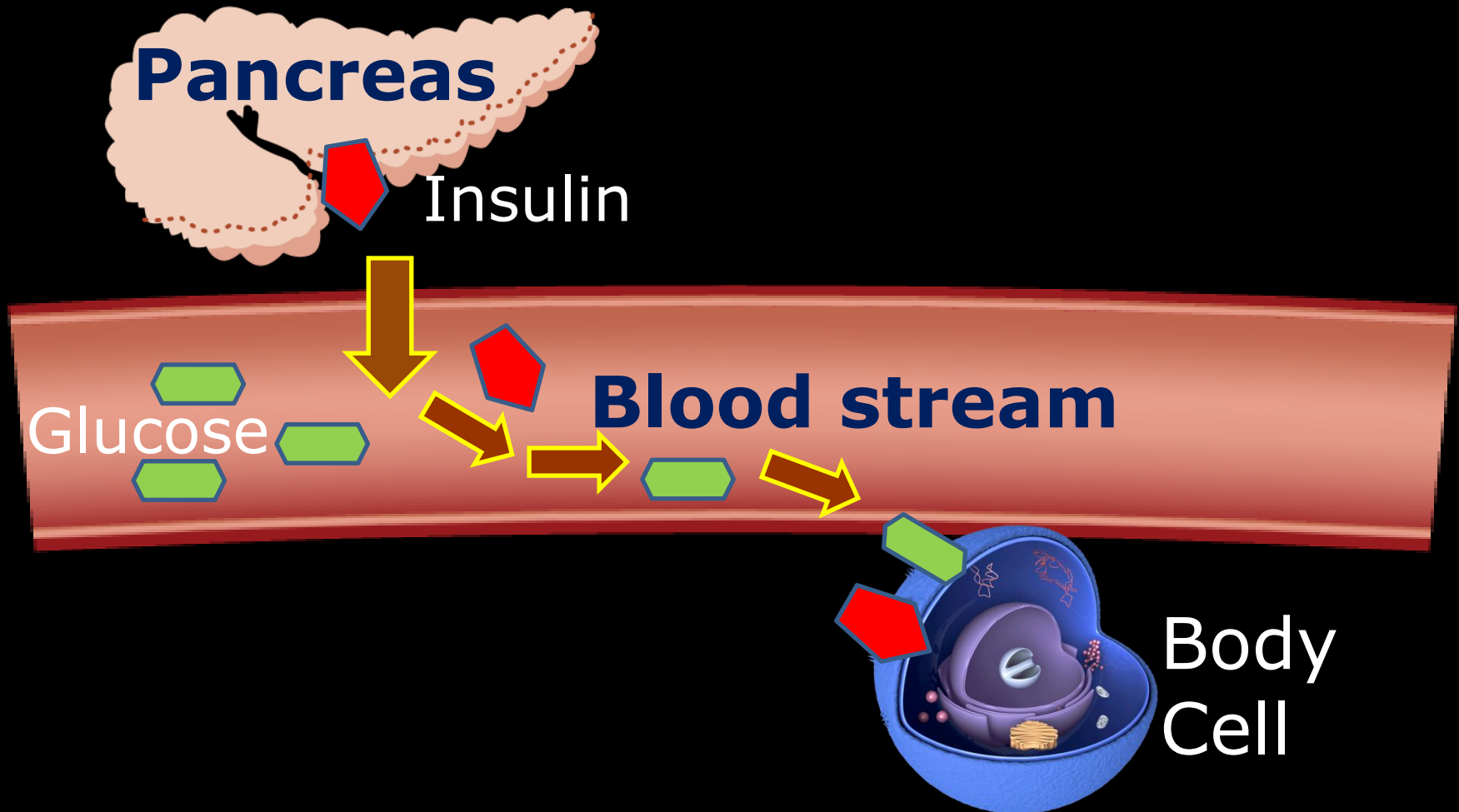


Blood stream

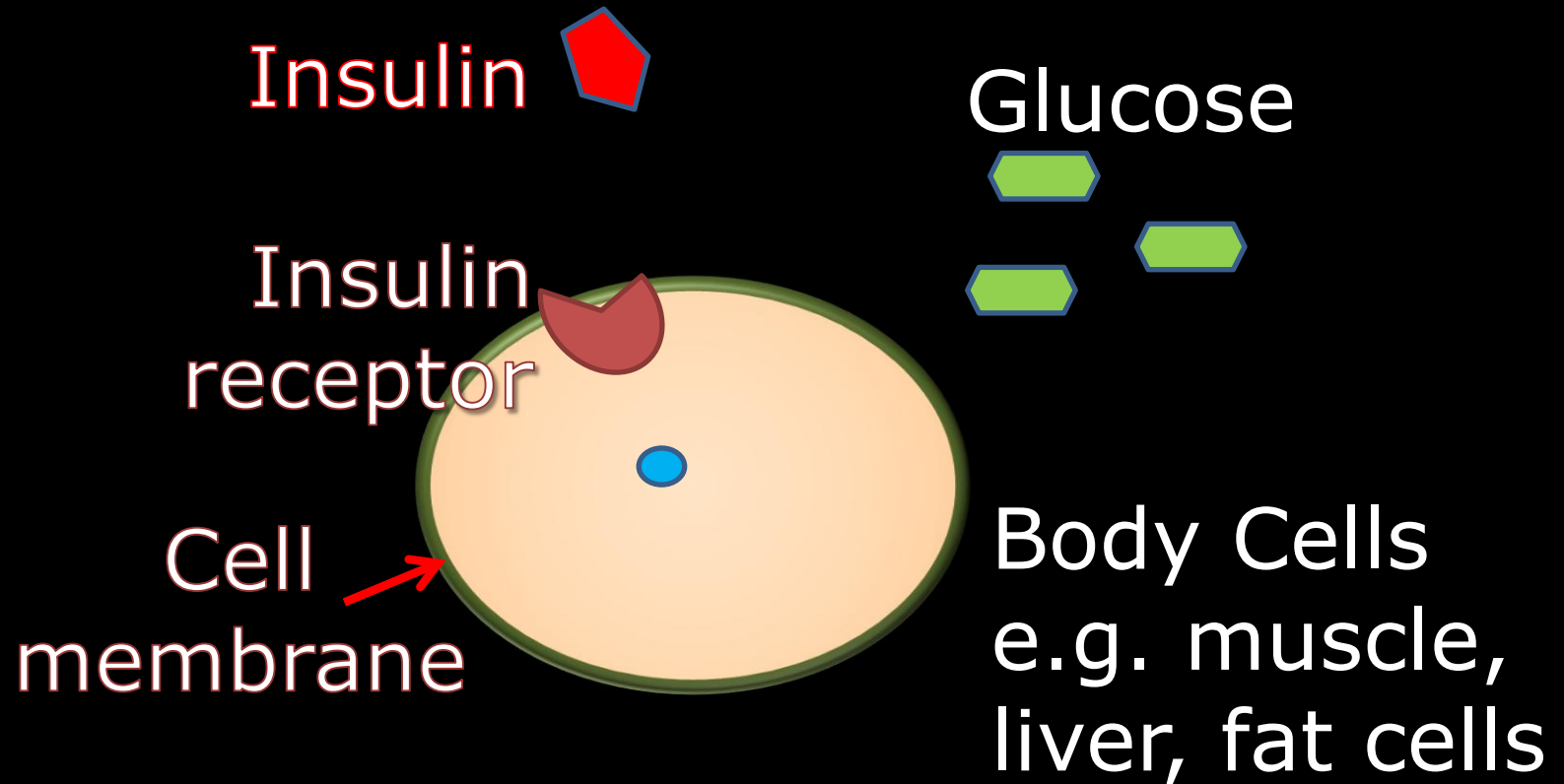
How does this happen?



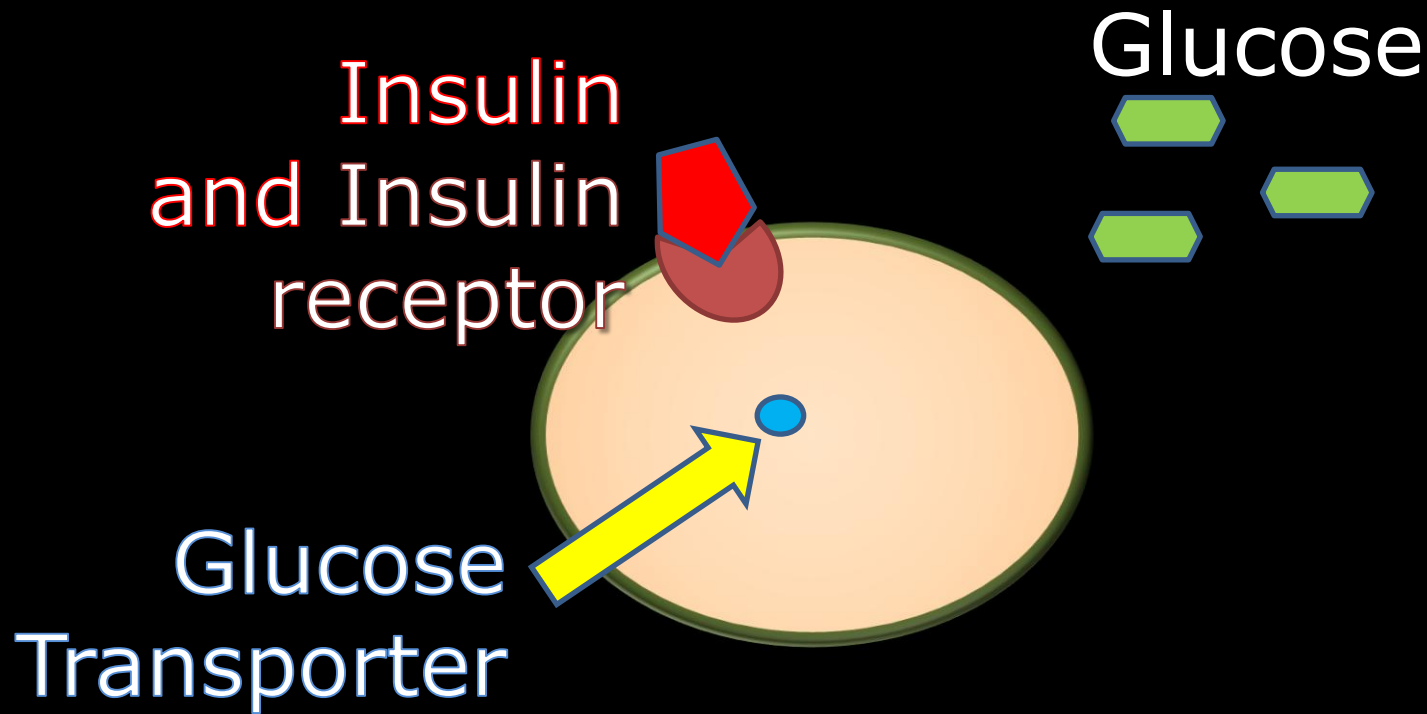
How does this happen?



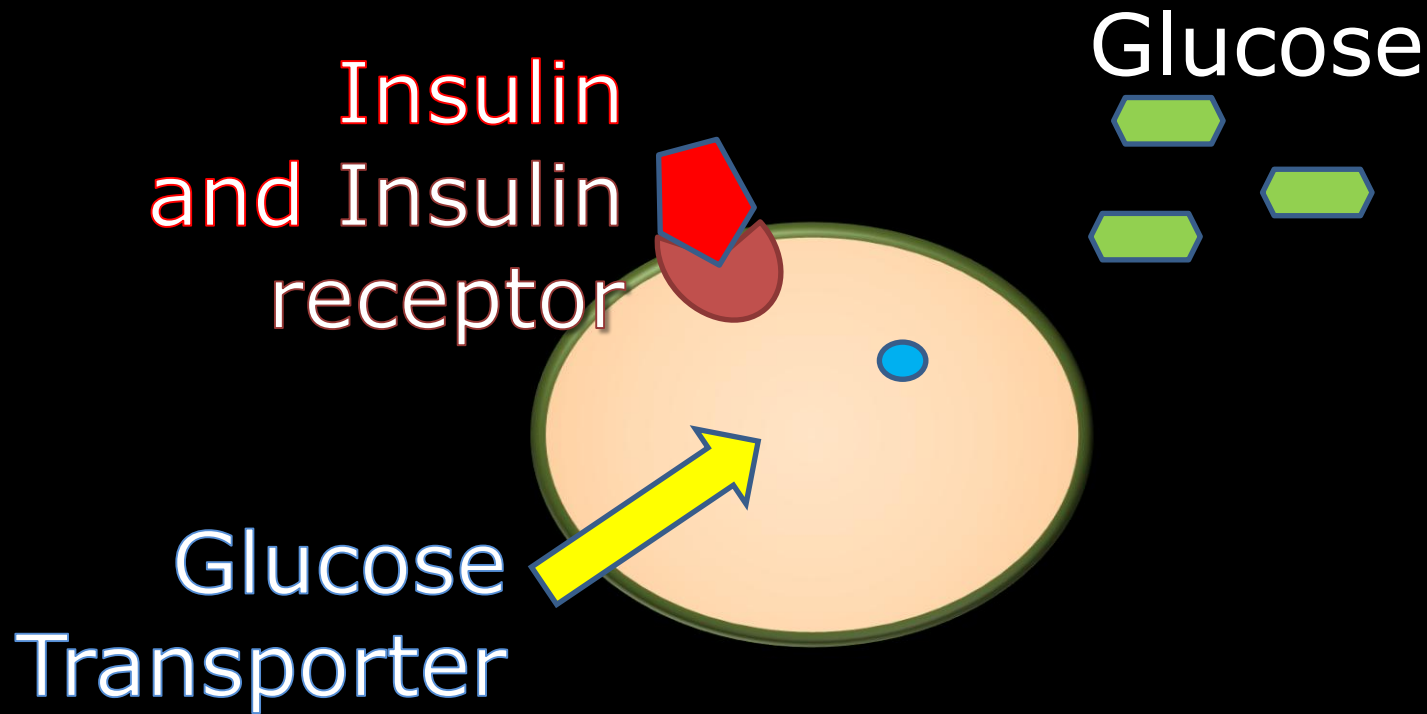
How does insulin work?



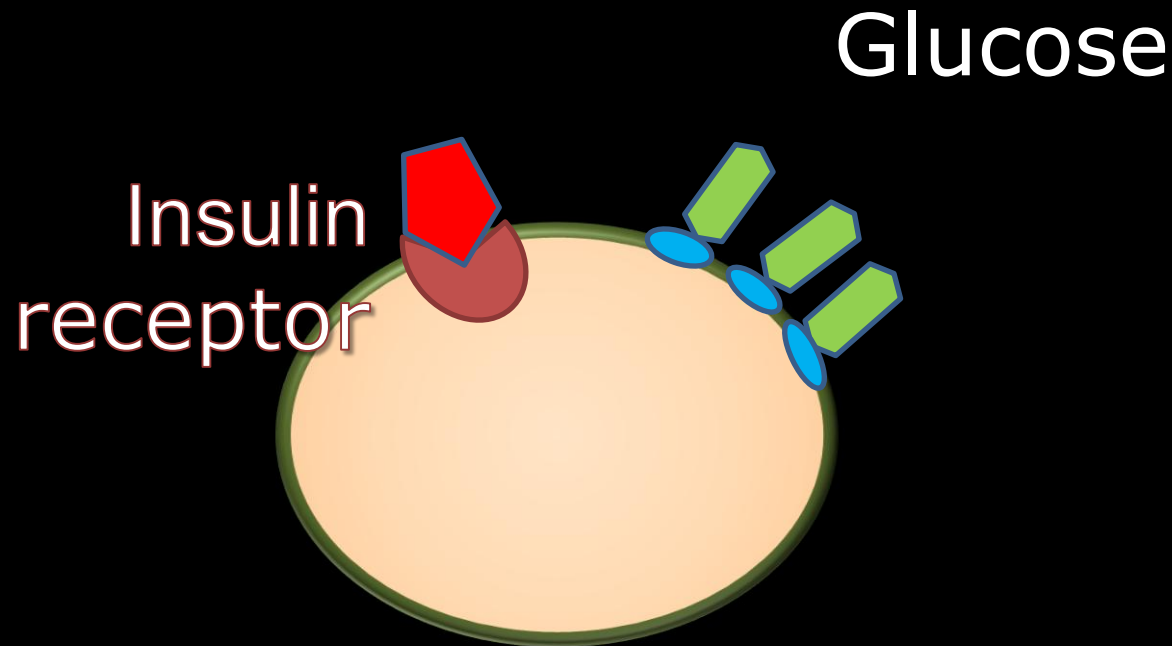
Insulin attaches to the many 'hooks' or receptors on the cells surface.



When insulin binds to a receptor a signal is sent ...



... to send transport molecules to
the cell surface ...

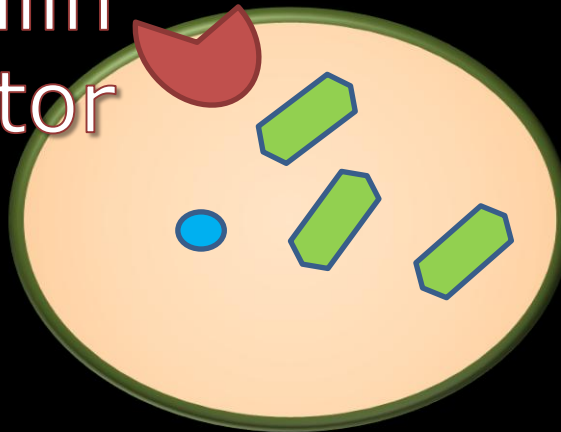


... so the glucose can move into
the cell.

Insulin



Insulin
receptor

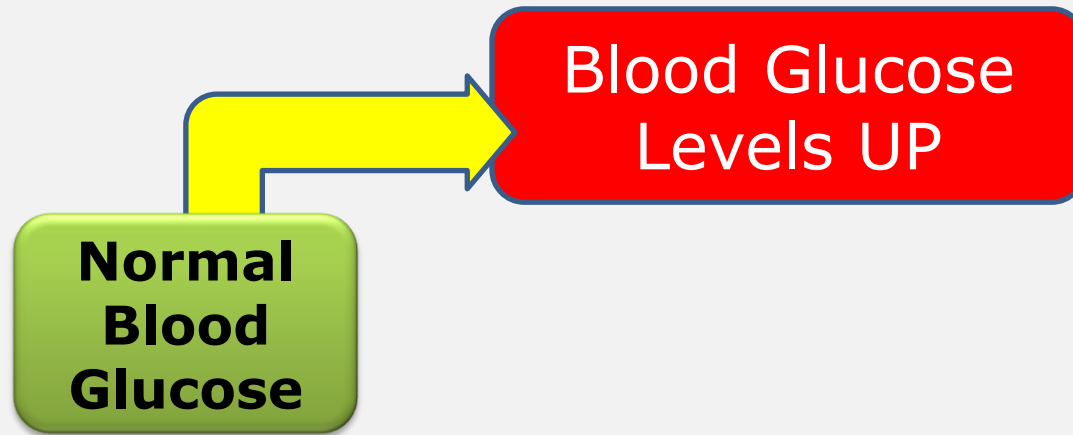


Insulin in Action

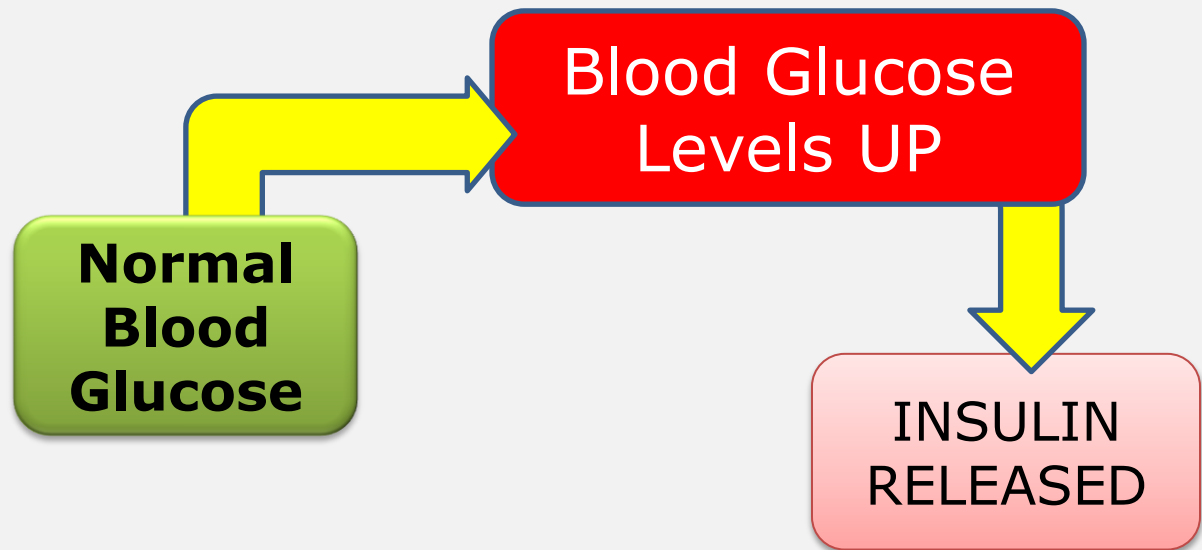
Food versus No Food

**Normal
Blood
Glucose**

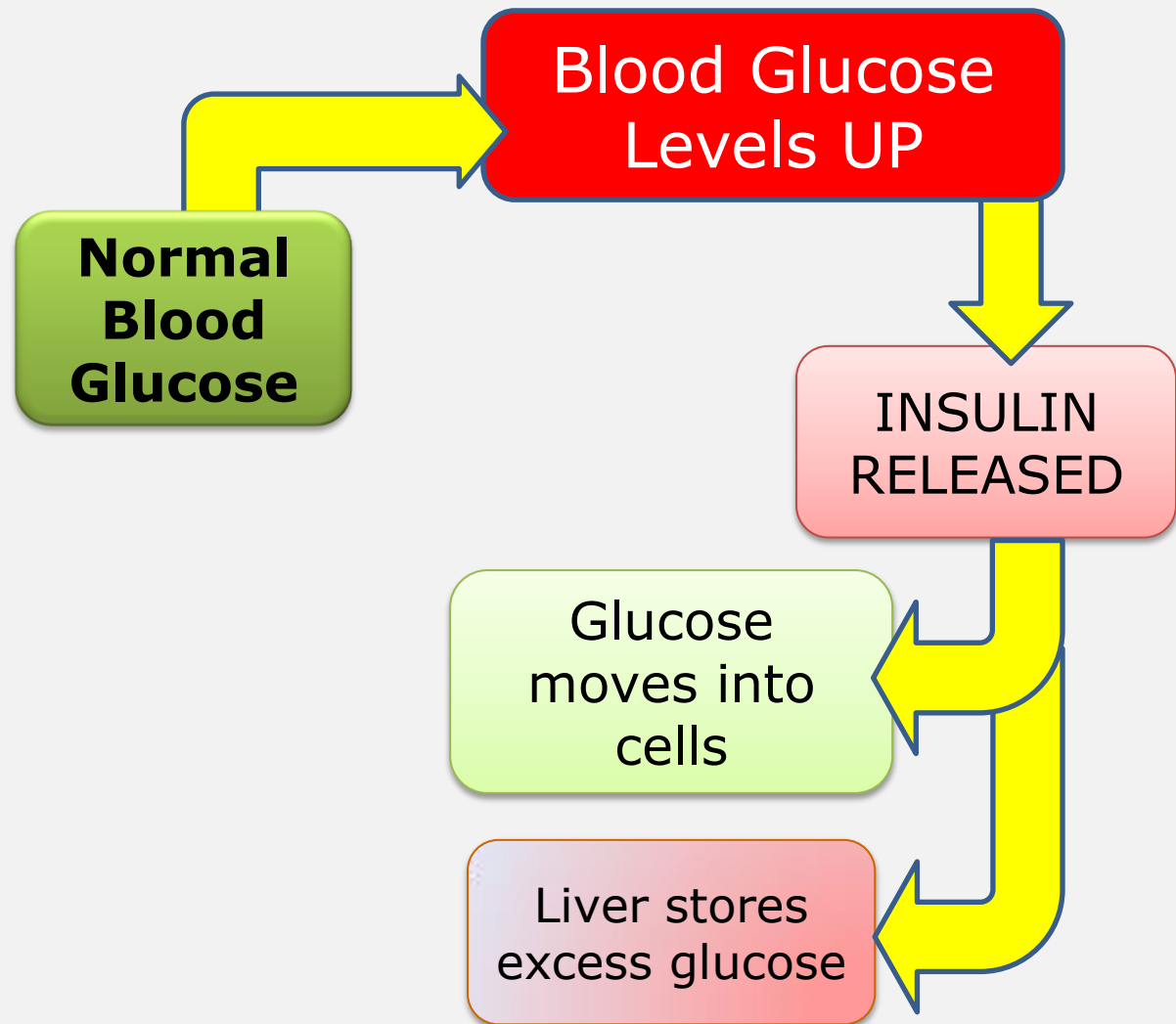
EAT FOOD



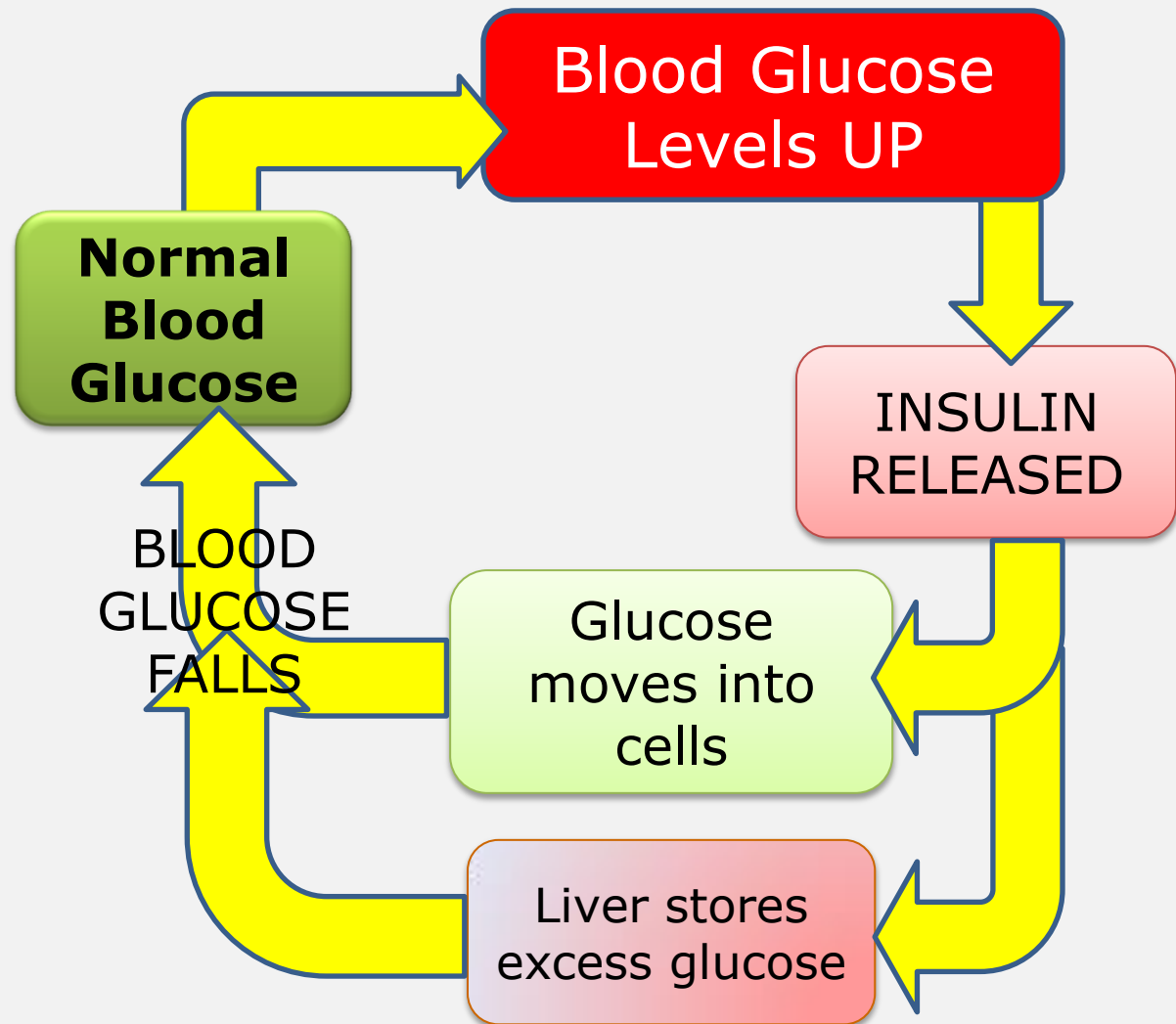
EAT FOOD



EAT FOOD

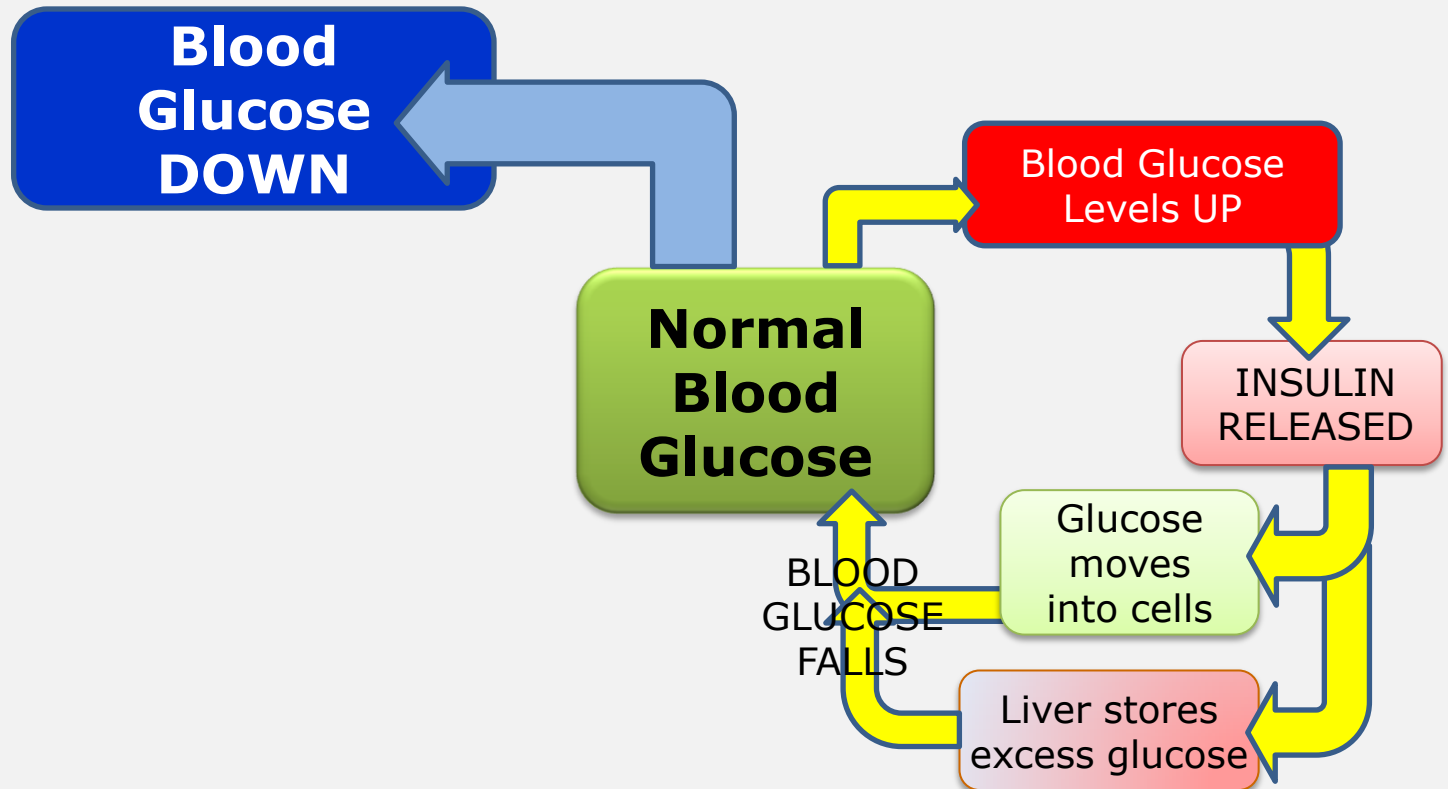


EAT FOOD

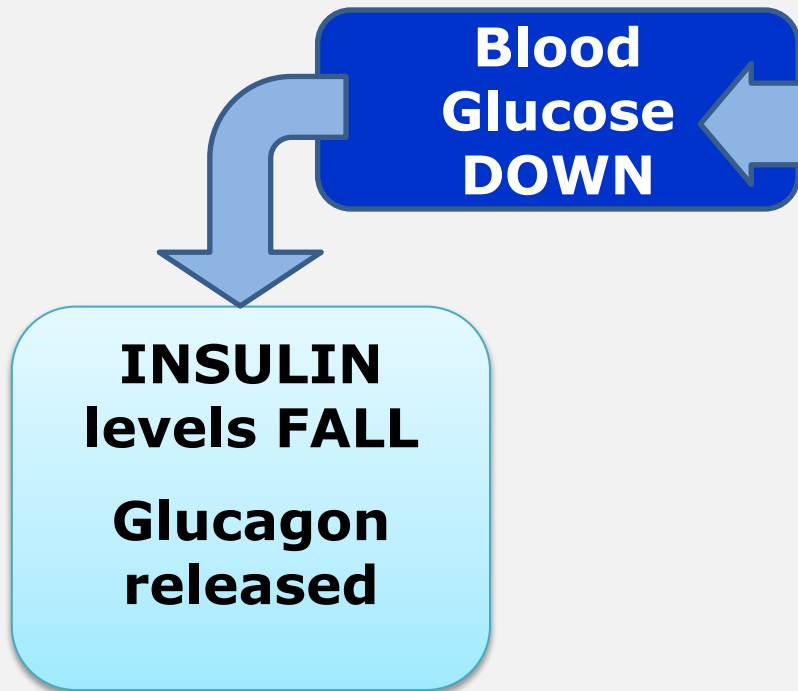


NO FOOD

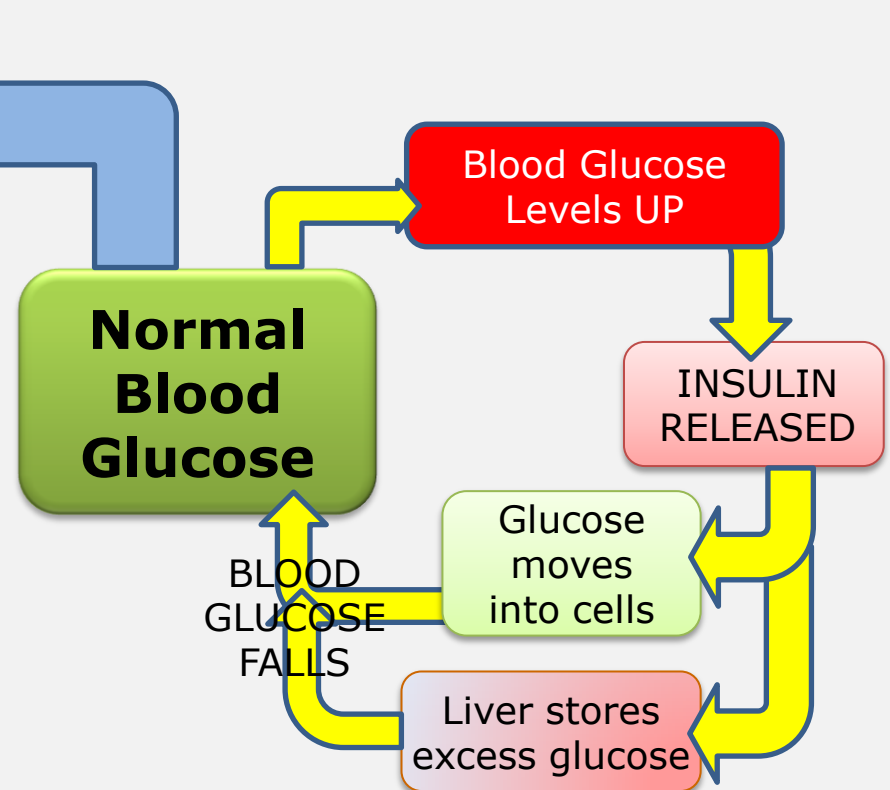
EAT FOOD



NO FOOD

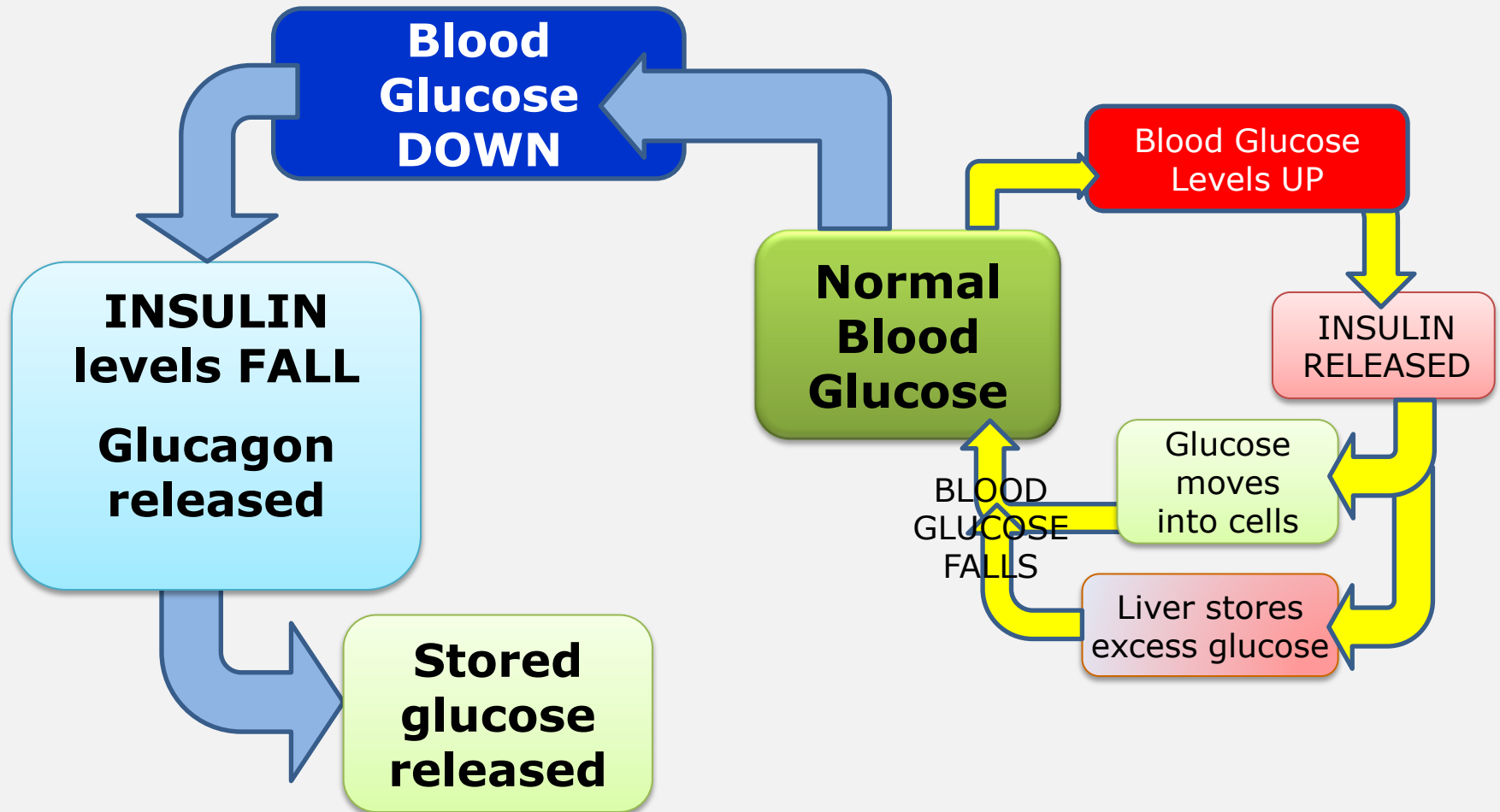


EAT FOOD



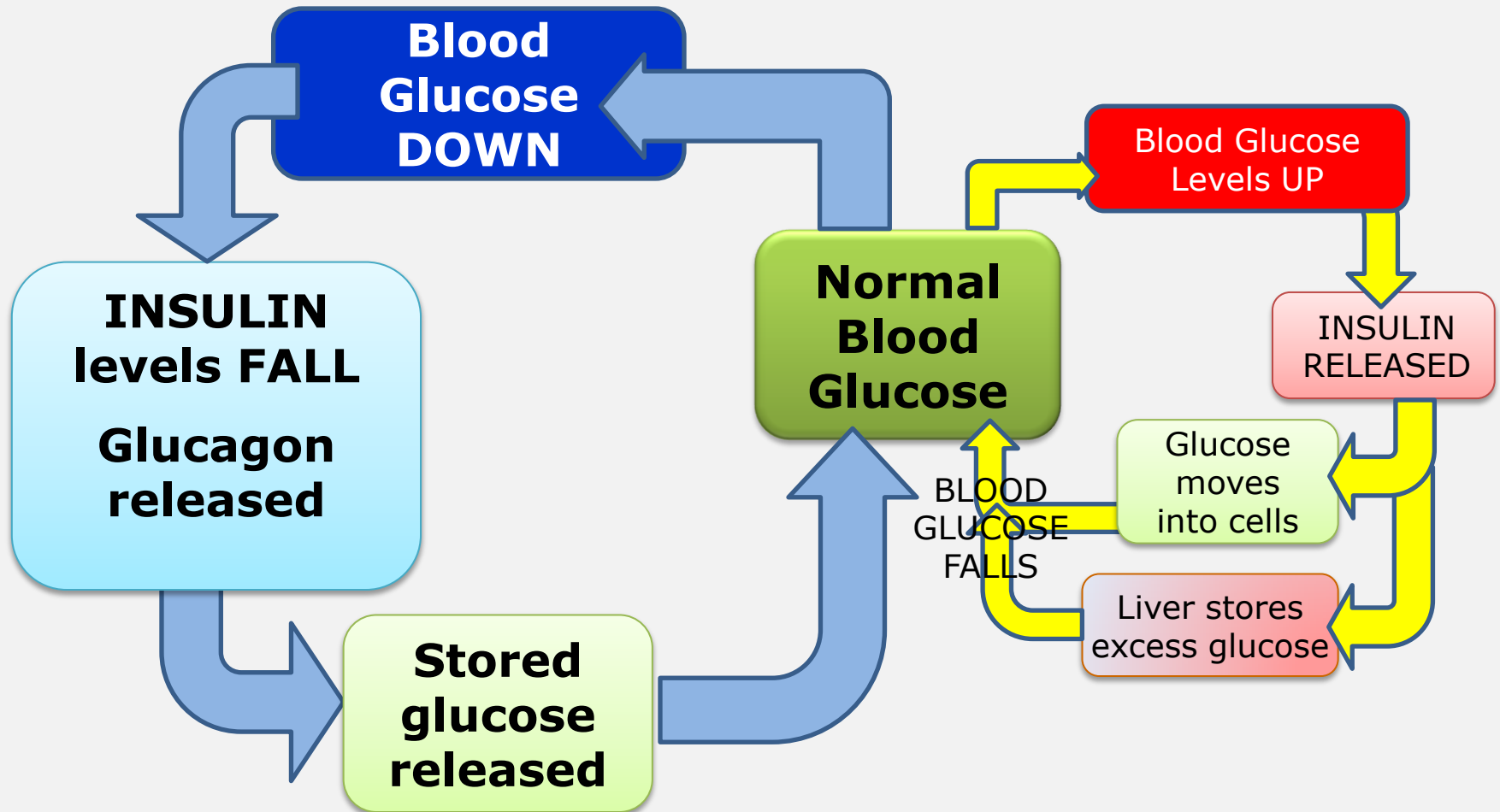
NO FOOD

EAT FOOD



NO FOOD

EAT FOOD



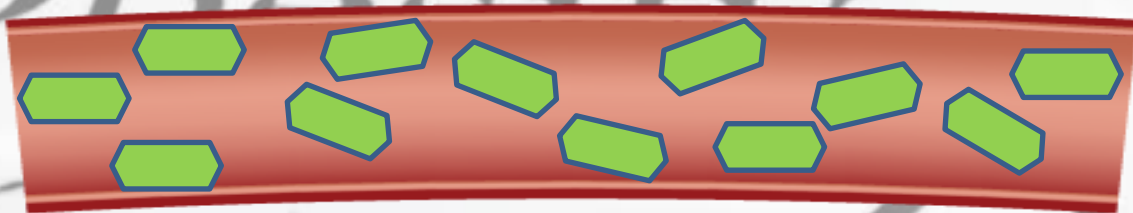
Types of Diabetes

The cells of a person with diabetes have problems taking up glucose due to either:

1. a lack of insulin → Type 1 diabetes
2. a resistance to the insulin
→ Type 2 diabetes.

What is Diabetes?

Diabetes is a disease that occurs when we have too much glucose (sugar) in the blood.



Problems caused by Diabetes



Problems caused by Diabetes

Strokes → can lead to death



Problems caused by Diabetes

Eye damage which can lead to blindness

Normal Vision



Problems caused by Diabetes

Eye damage which can lead to blindness



Normal Vision



Diabetic Retinopathy
– a common diabetic eye disease



Problems caused by Diabetes



Heart damage which can lead to a heart attack

Problems caused by Diabetes



Kidney damage and potentially
kidney failure

Problems caused by Diabetes



Reduced blood supply to hands and feet can lead to loss of limbs

Problems caused by Diabetes

- Strokes → can lead to death
- Eye damage → blindness
- Heart damage → heart attack
- Kidney damage → kidney failure
- Reduced blood supply to hands and feet
→ loss of limbs



Problems caused by Diabetes

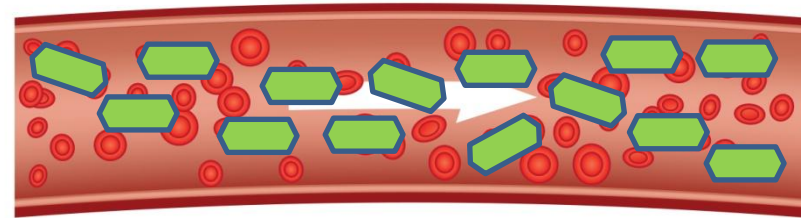
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WHY?

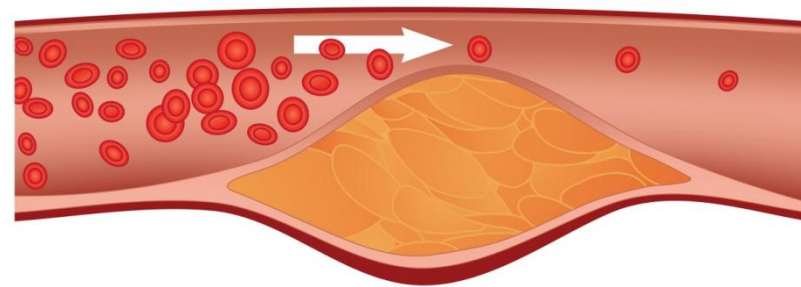


What causes these problems?

Some of the glucose that remains in the blood stream is absorbed by the cells lining the blood vessels.



These cells swell up, the blood vessels become leaky and may become blocked. Diabetics have a high risk of plaques forming that may block blood vessels.



Diabetes **causes** the damage of small blood vessels. This **results** in other diseases – in the eyes, kidney failure, heart disease.

Type 2 diabetes

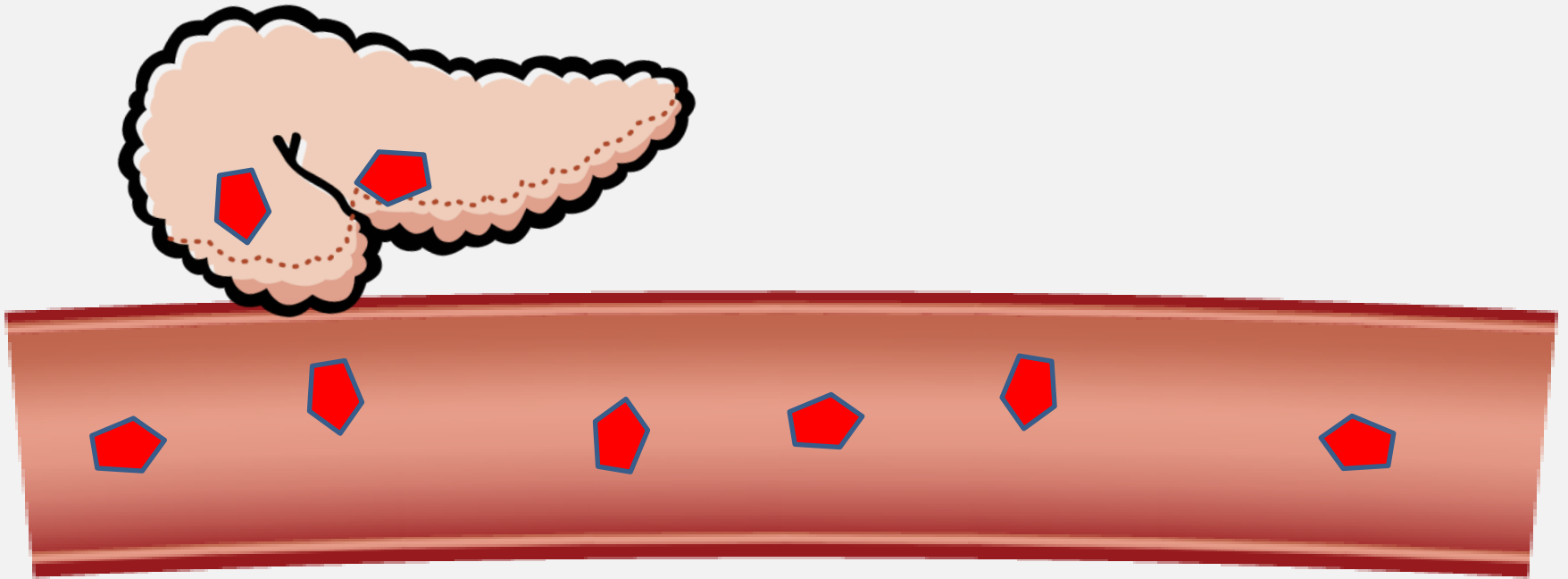
Insulin resistance



What is Insulin Resistance?

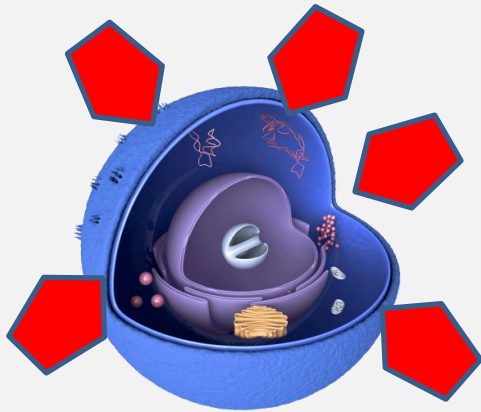
Insulin Resistance

The pancreas produces insulin but the body does not use it properly.



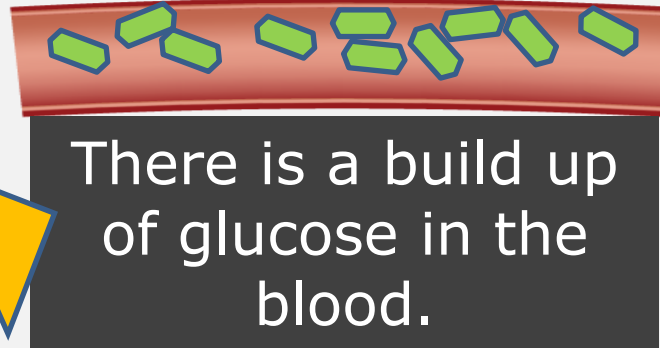
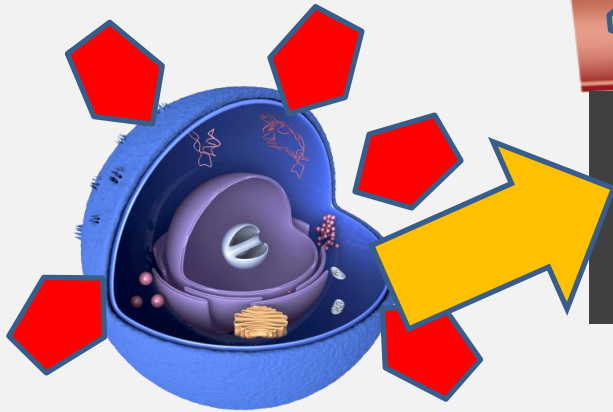
How do you become insulin resistant?

How do you become insulin resistant?



Cells in your body do not respond properly to insulin.

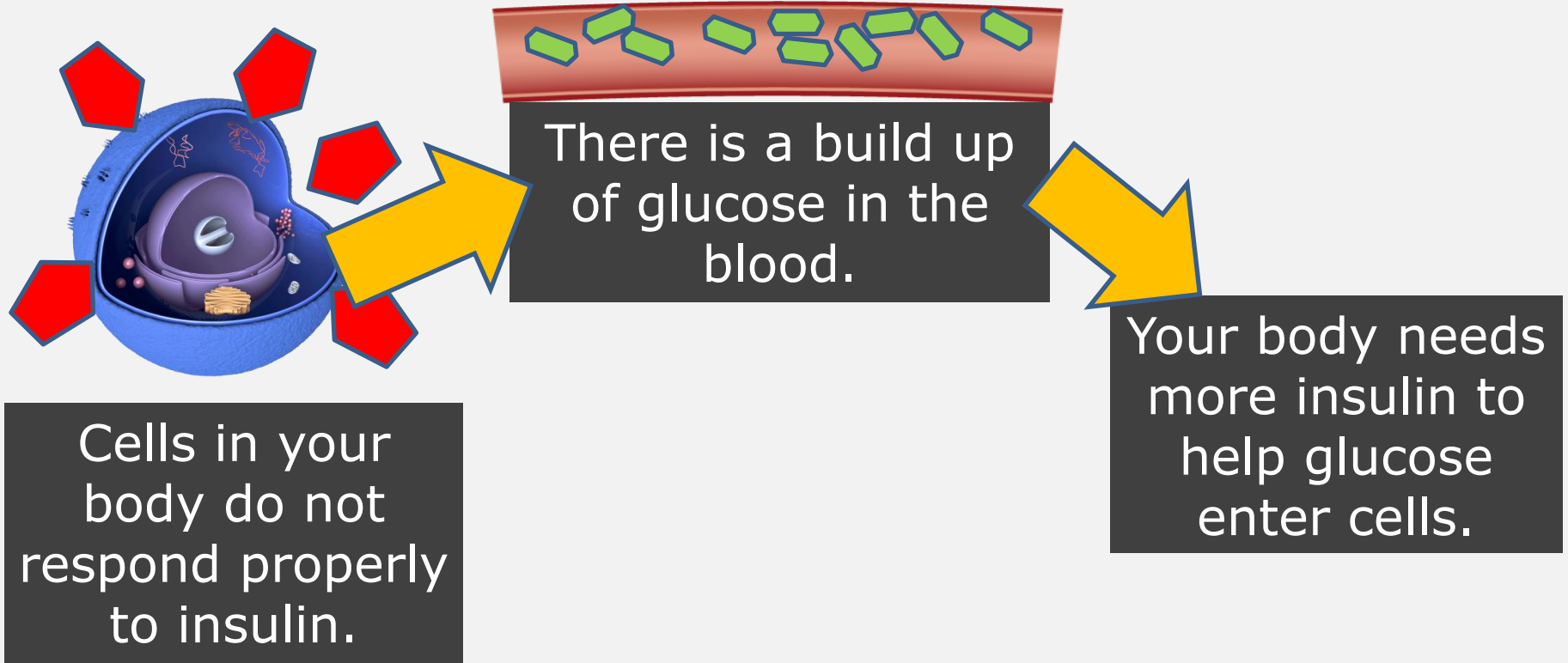
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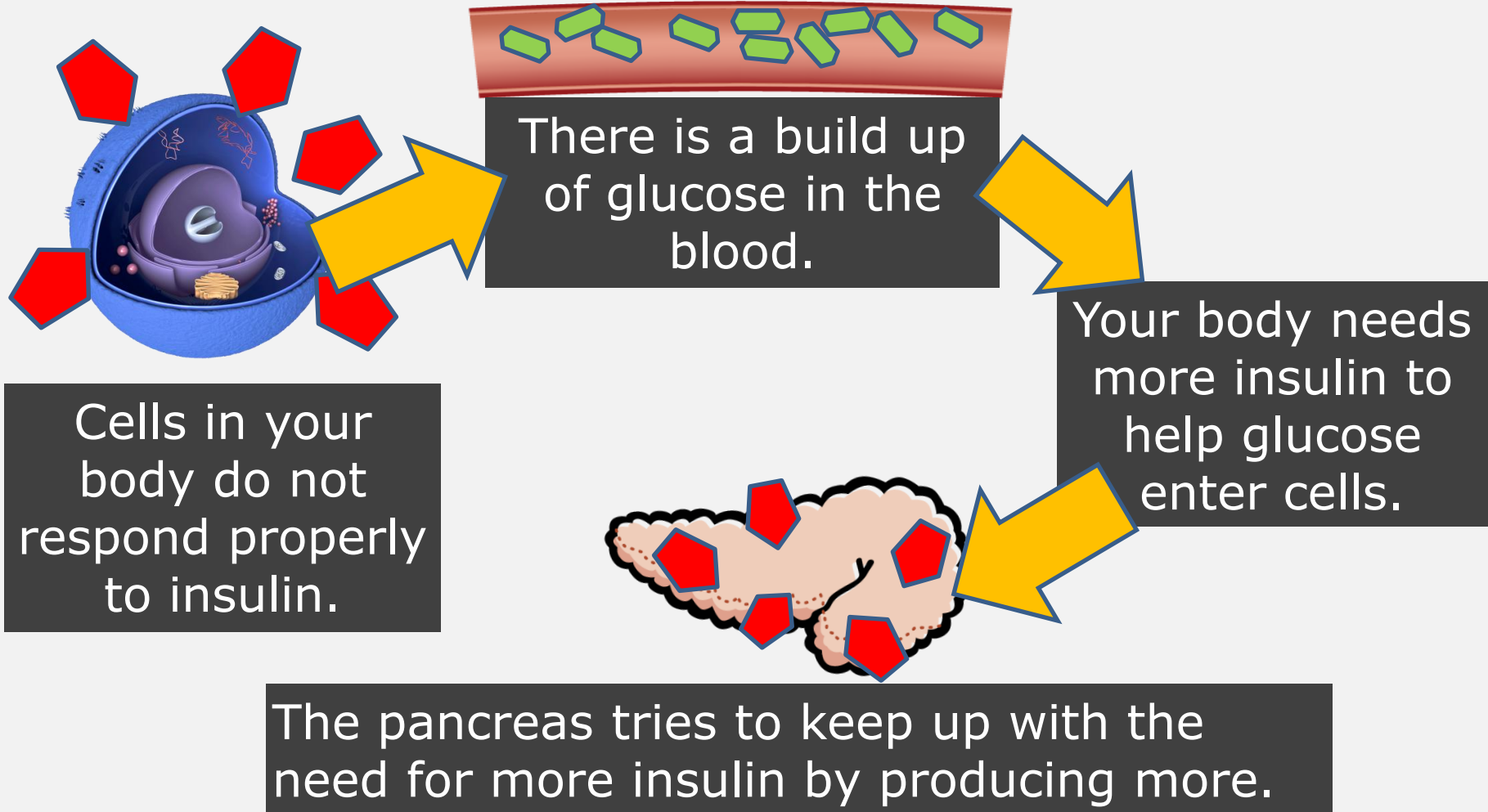
There is a build up of glucose in the blood.

Cells in your body do not respond properly to insulin.

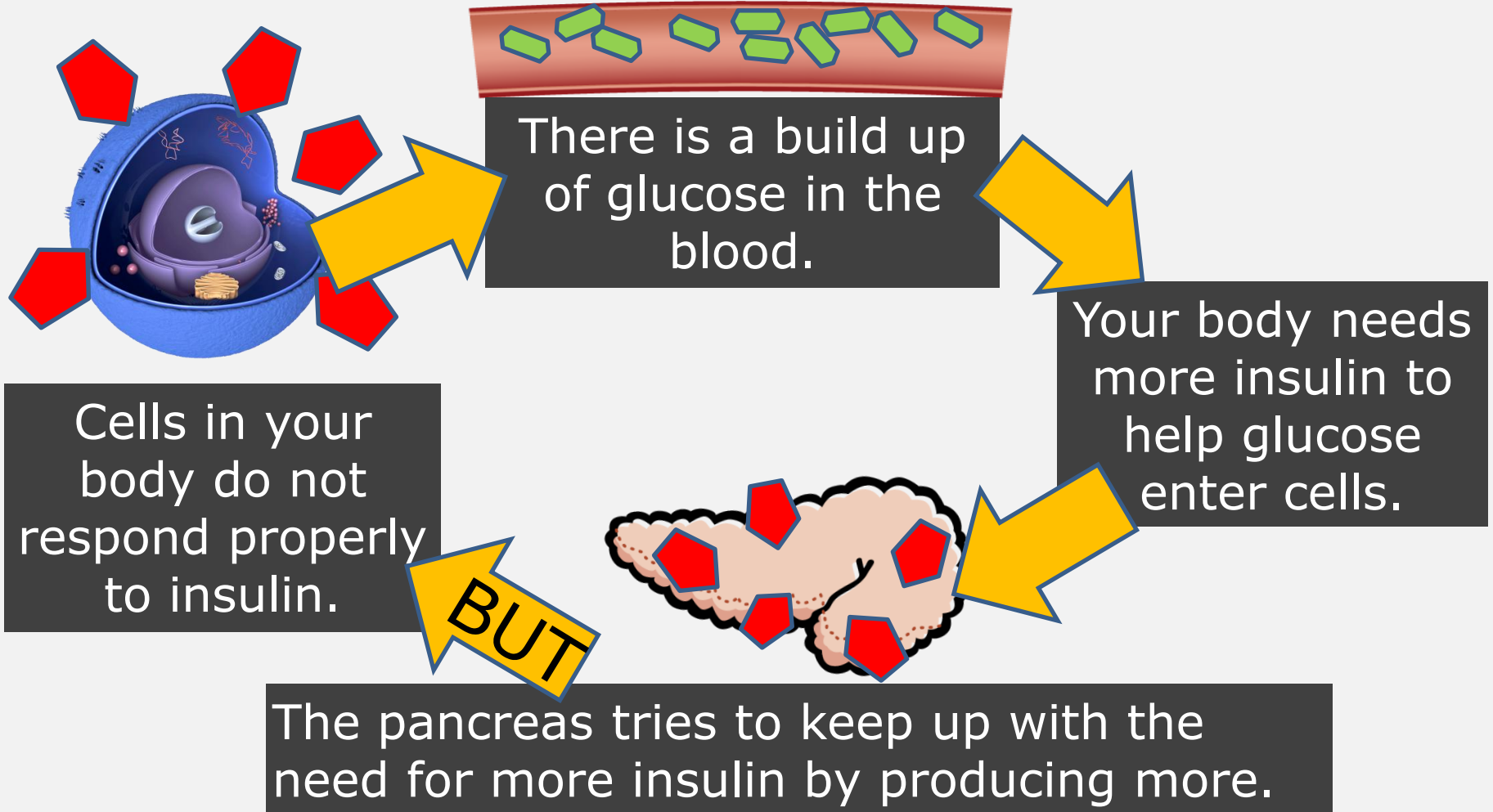
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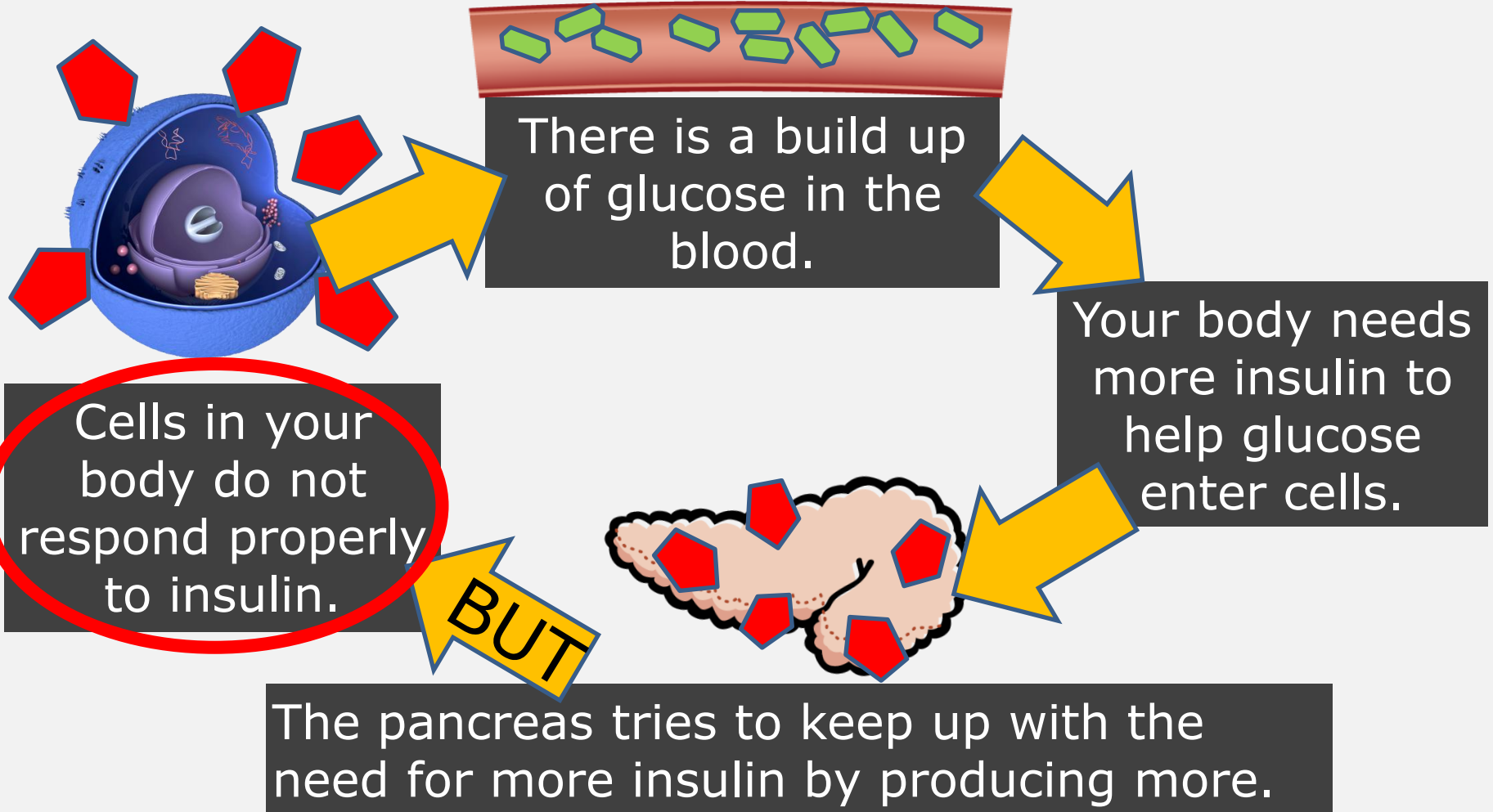
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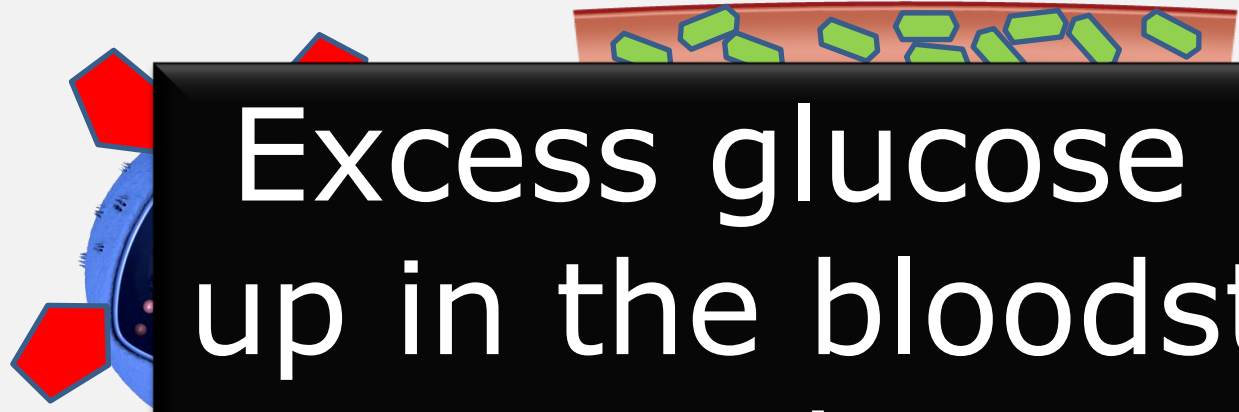
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How do you become insulin resistant?



Excess glucose builds up in the bloodstream, setting the stage for Type 2 diabetes.

The diagram shows a cross-section of a blood vessel with green hexagonal glucose molecules inside. To the left, a blue cell is shown with red hexagonal insulin molecules outside it. A red circle highlights the text 'Cells become resistant to insulin.' on the left side of the slide.

BUT

The pancreas tries to keep up with the need for more insulin by producing more.